What is claimed is:

1. A method of solving Material-Maxwell's equations for the analysis of light scattered off 2D or 3D micro or nanoelectronic structures, such that all wavelengths of the incident light can be analyzed and computed simultaneously in real time on a single processor for transverse electric (TE) and for transverse magnetic (TM) polarizations.

2. A method as recited in claim 1, wherein said method is sufficiently general that it can be used on either single or multiple processors.

3. A method as recited in claim 1, wherein said method is applicable to microwave technology of range of a few cm wavelengths.

4. A method as recited in claim 1, wherein said method is able to process complicated lossy material structures, utilizing a unique method of analyzing very large domains in terms of a transformation of small finite domains.

5. A method as recited in claim 1, wherein said method is applied to microchip fabrication encompassing a range of 50nm-1500nm uniformly.

6. A method as recited in claim 1, wherein said method is comprising of a "rendering algorithm" that enables the use of a larger numerical grid than the smallest feature sizes, but that enables the scattering target to be characterized up to a fraction of this size.

7. A method as recited in claim 1, wherein said method is employed in the computation of reflected spectra for TE&TM polarization, reporting their ratio as a function of frequency, thus eliminating any spurious oscillations associated with the source.

8. A method of constructing an electrical susceptibility function in time-domain space utilizing measurable optical constants whose components of said function are Lorenz poles, Xlorenz-linear poles, Debye poles, conductivity term, a non-magnetized plasma term and a limiting constant for infinite wavelength.

9. A method as recited in claim 8, wherein said method is satisfying strict causality properties in time domain space.

10 A method as recited in claim 8, wherein said method guarantees that the refractive index and the absorption coefficients ($n\&k$) are positive for all wavelengths.

11 A method as recited in claim 8, wherein said method allows extraction of said $n\&k$ recited in claim 10 satisfying strict causality relations, term by term.

12 A method as recited in claim 8, wherein said method provides the structured boundary layer representing large or semi-infinite domain, with poles determined from recited susceptibility function of claim 8, with variation of the coefficients in the numerators, obtained by imposing a non-reflection condition. The conductivity term becomes a mixture of conductivity and collisionless plasma and the plasma term becomes a combination of cited conductivity and Debye terms.

13 A method of scattering object's complex shape and composition.

14 A method as recited in claim 13, wherein said method constructs a seed Hessian without employing numerical derivative, using local parameter minimization as a guide.

15 A method as recited in claim 13, wherein said method makes the reconstruction problem less ill posed by reducing the oscillatory nature of the scattered radiation, by eliminating the need to normalize the radiation source, and analyzing the ratio and relative phase of the TM and TE polarization for each wavelength of interest as the backbone of the cost function.

16 A method as recited in claim 13, wherein said method is equally valid for 2D and 3D structures.